

HBD analysis

workfest

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Analysis plan

- HBD code development
 - Random rejection → **DONE**
 - Double rejection → **PENDING**
- QA
 - CA → **DONE**
 - HBD → **DONE**
 - Additional gain calibration
- Cross section of J/Psi (To see if cuts are under control) → **I am here**
 - Simulation tuning
 - Electron id efficiency + acceptance
 - Embedding efficiency
 - Ghost cut efficiency
- Normalization, Cut optimization, Systematic error, Low-mass spectra

backup

HbdMinPadClusterizer

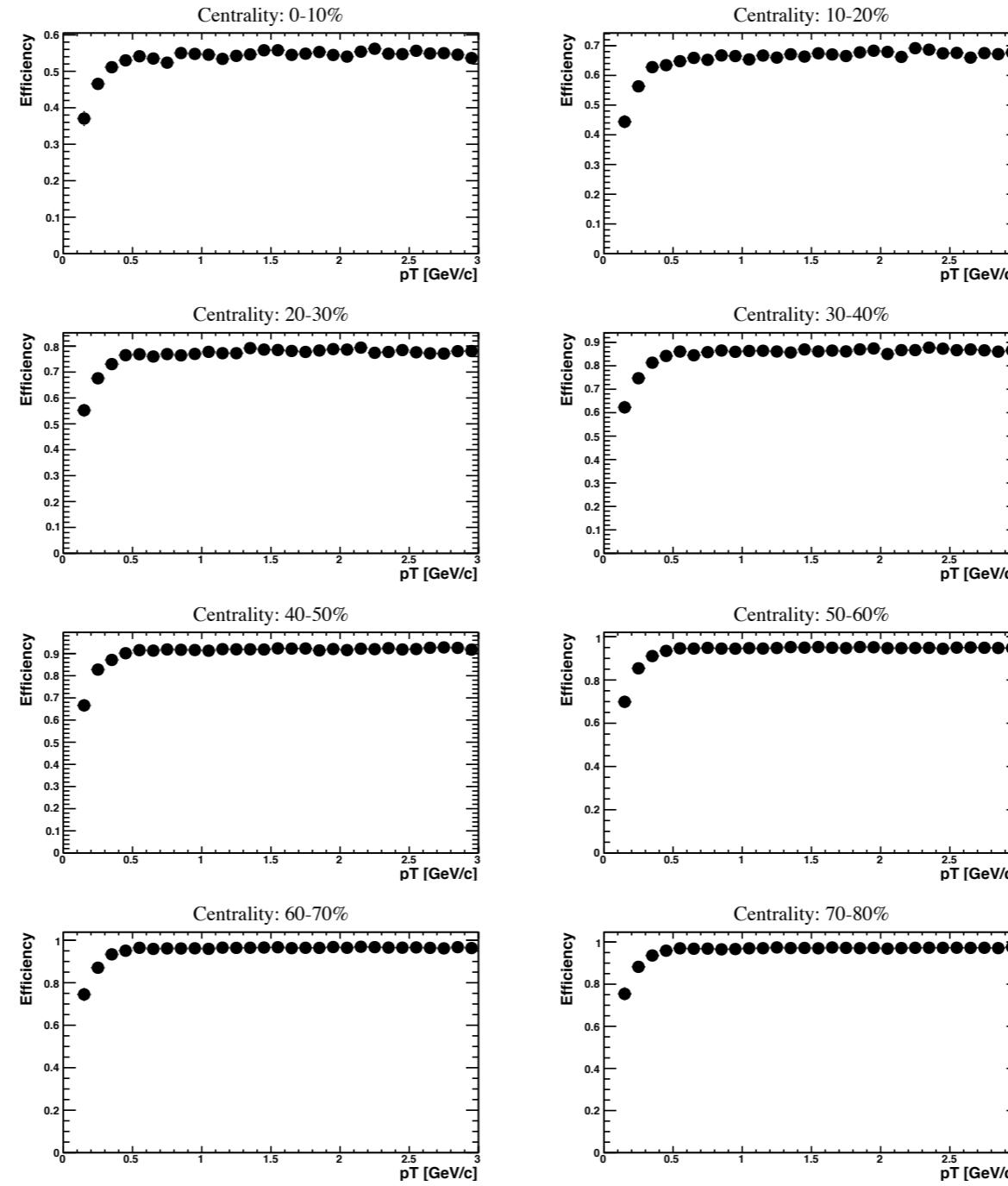
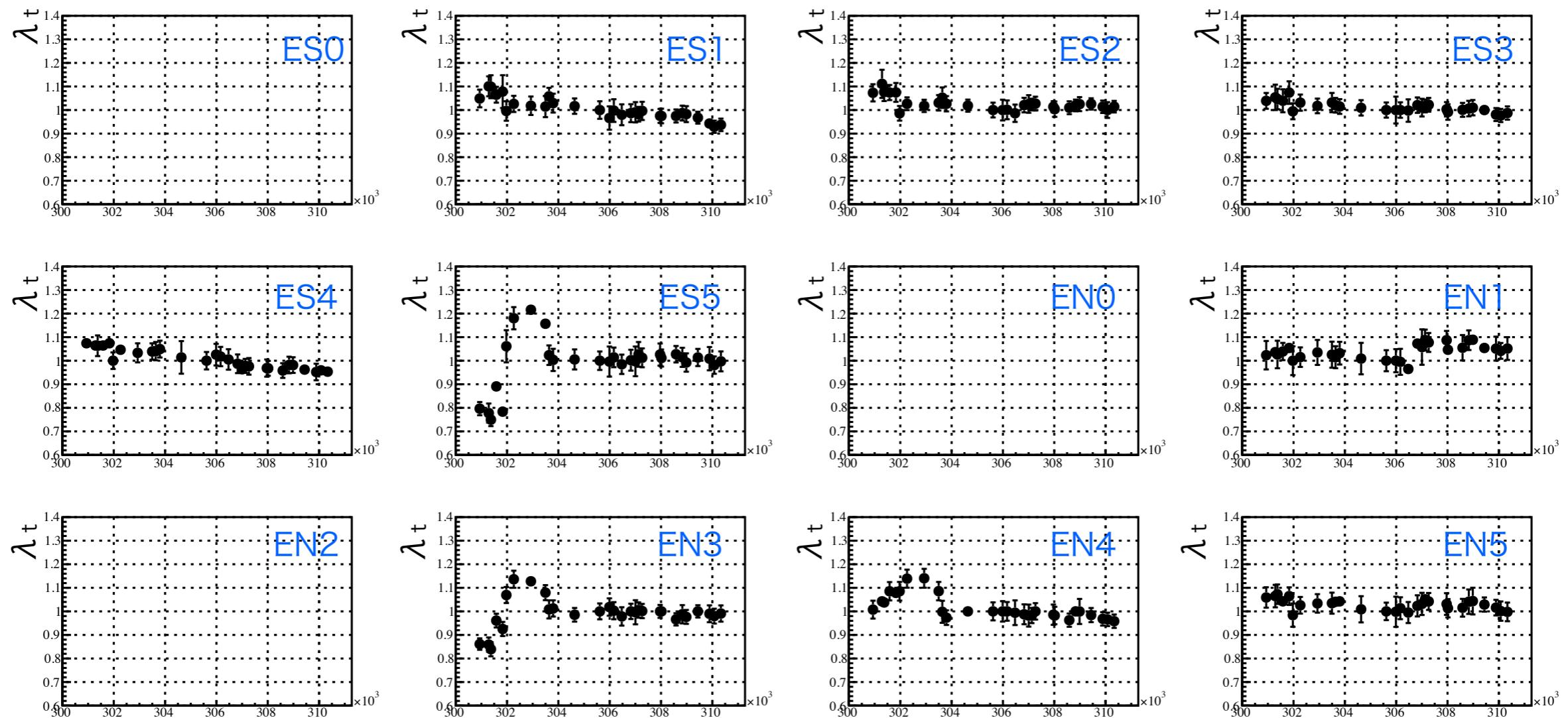
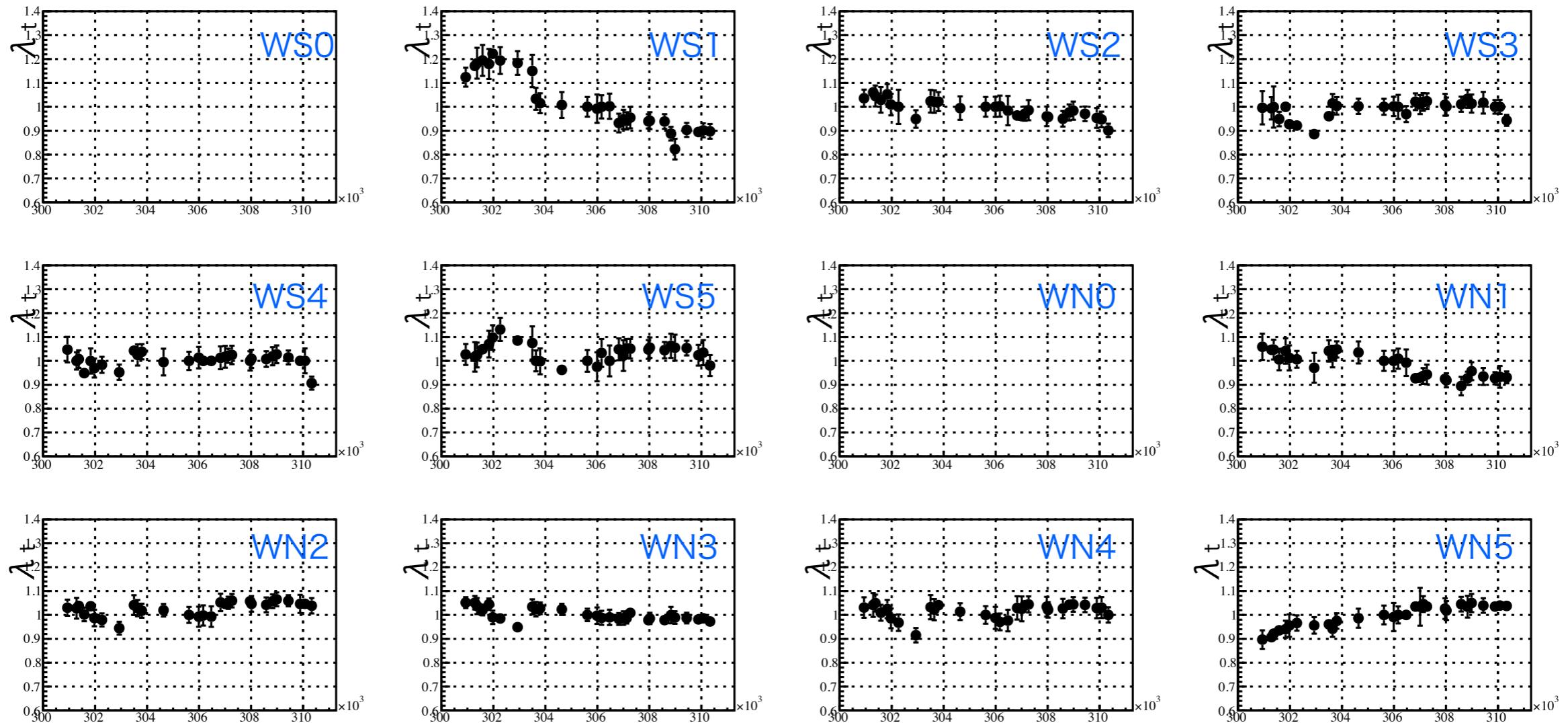


Figure 47: Electron efficiency as a function of pT for the case of $hbdid \geq 10$. See the text for the definition of $hbdid$.

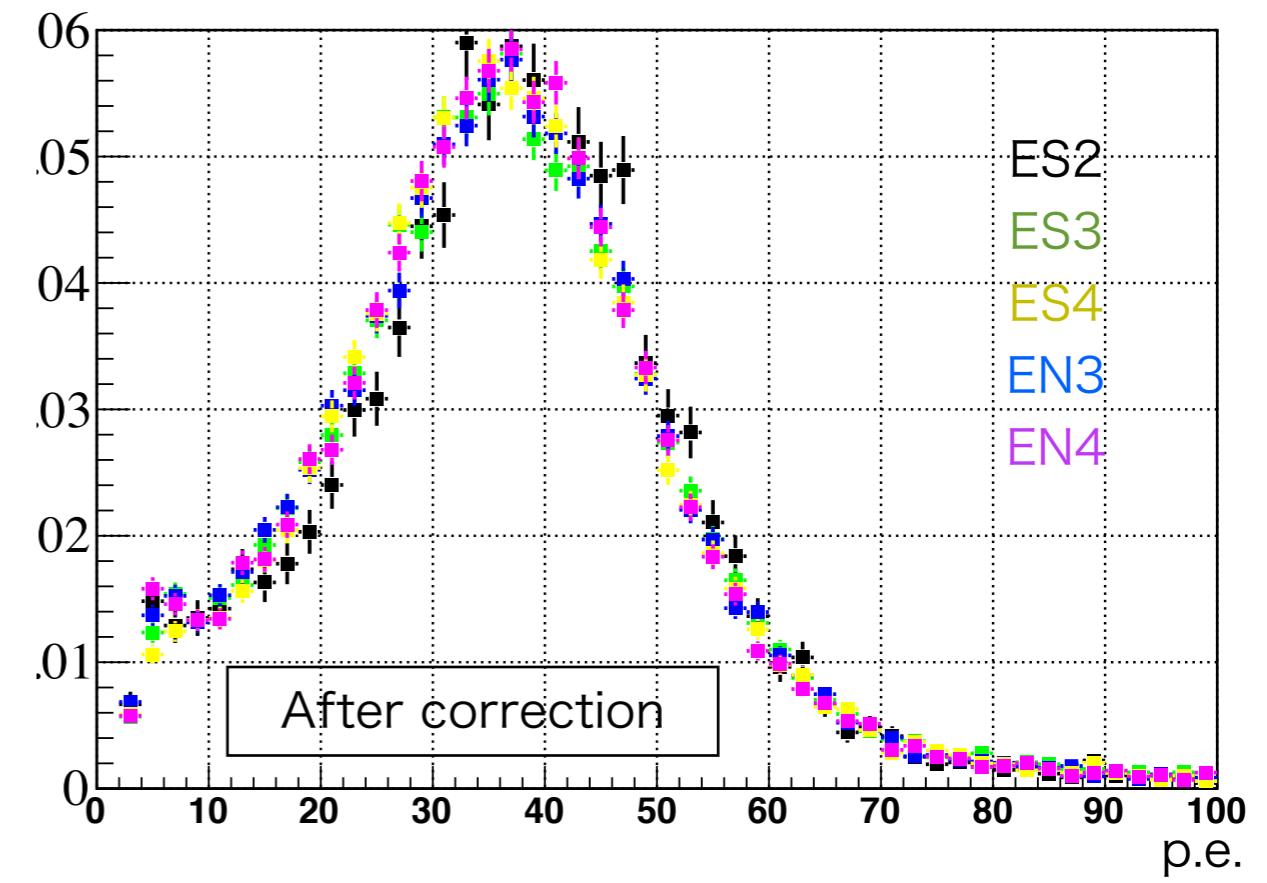
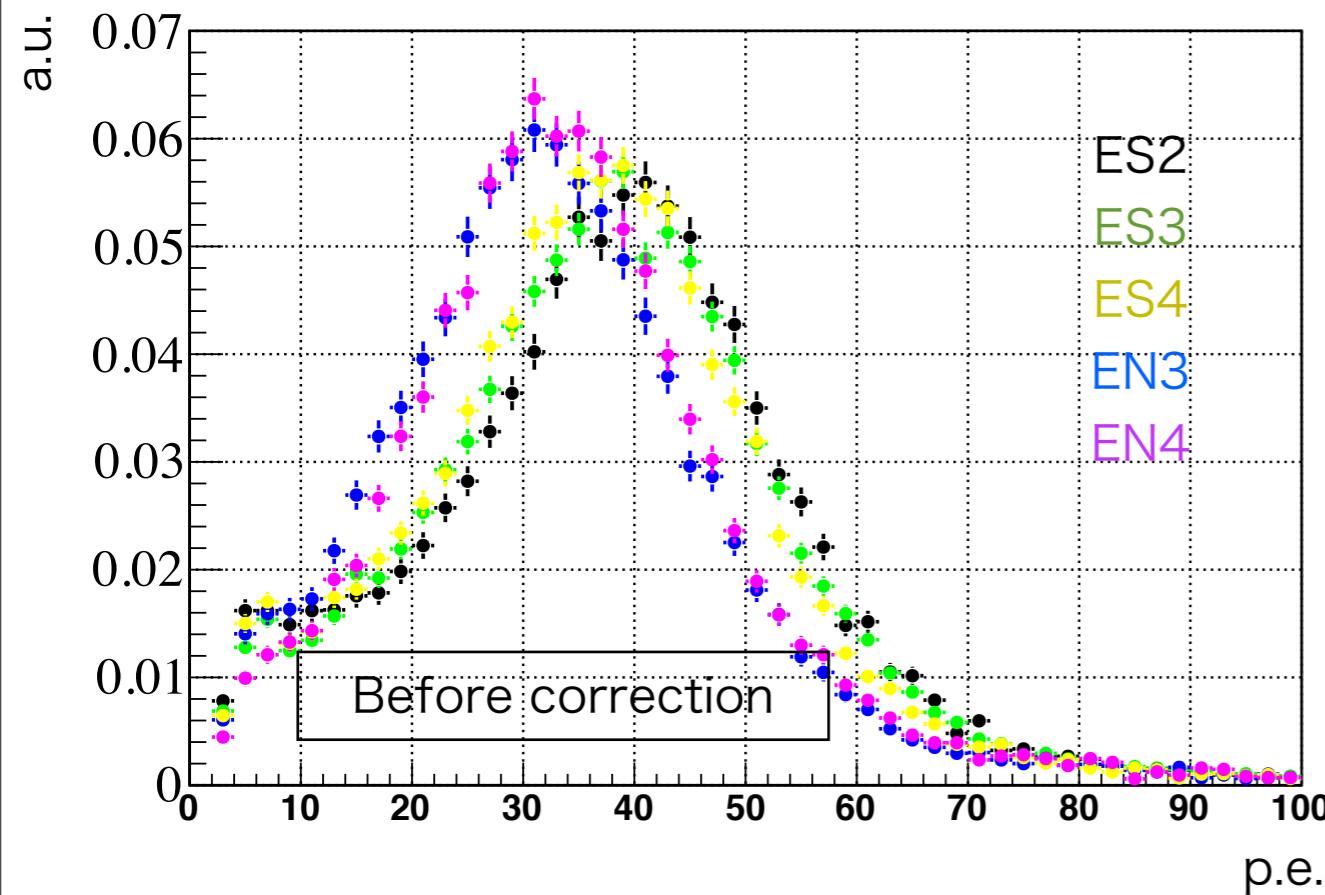
Additional gain calibration (time dependence)



Additional gain calibration (time dependence)



Additional gain calibration (module by module)

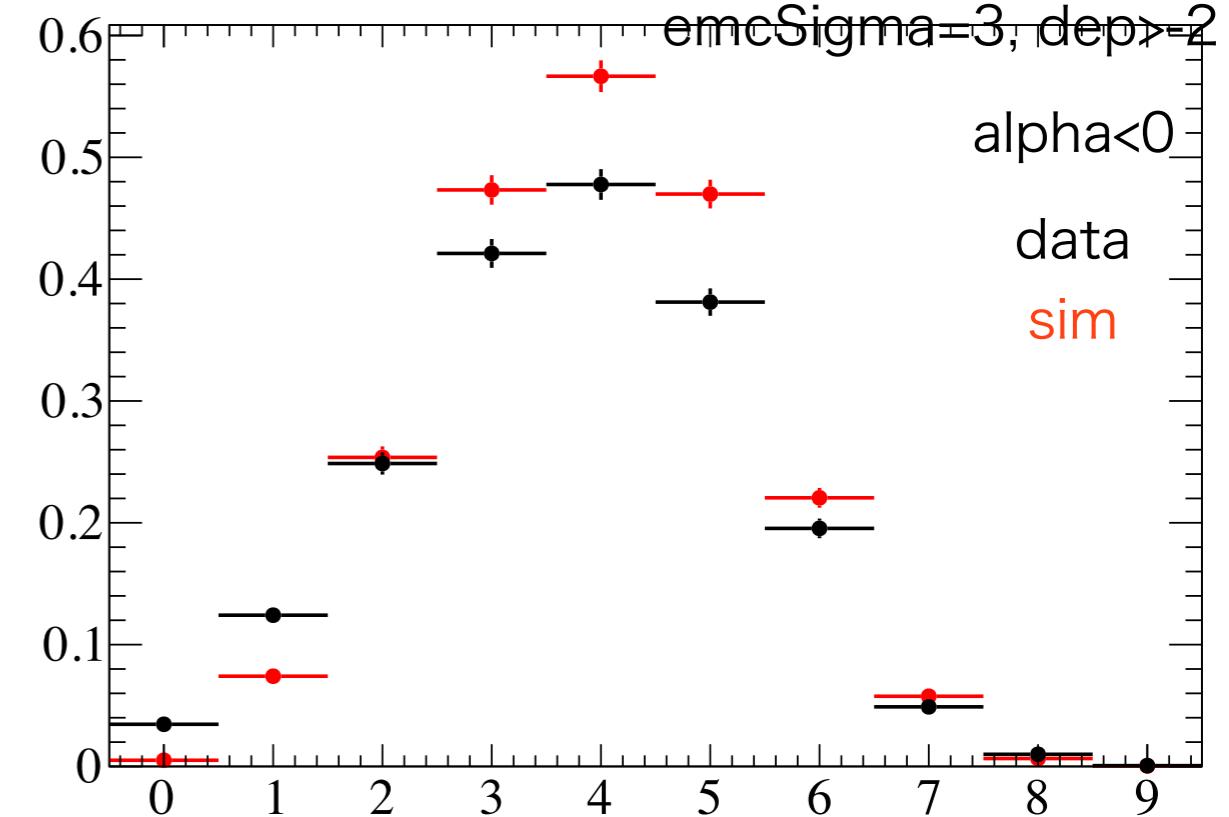
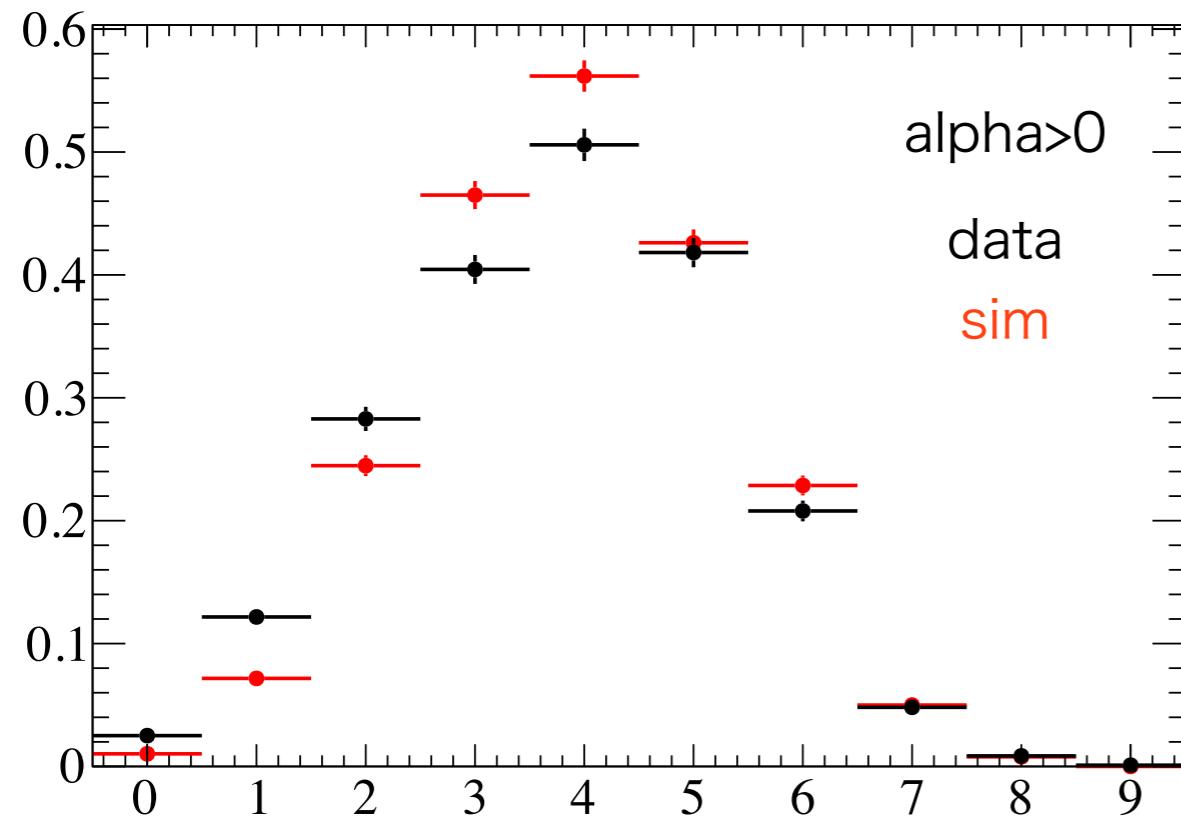


- WisClusterizer
- Cut
 - 200GeV: Centrality: 60-92%
 - CA eid cut ($\text{pt} > 0.2, \text{n} > 2, \text{disp} < 5, |\text{emcdphi}| < 0.03, |\text{emcdz} + 1| < 15, \text{ecore/mom} > 0.6$)
 - $\text{mass} < 30\text{MeV}/c^2$, opening angle $< 50\text{mrad}$, $\text{phiV} < (0.018 + 0.93 \cdot \exp(-16.82 \cdot \text{mass}))$

Simulation tuning

(RICH,n0)

cent: 50%-
pt>0.2GeV, qual=31||51||63

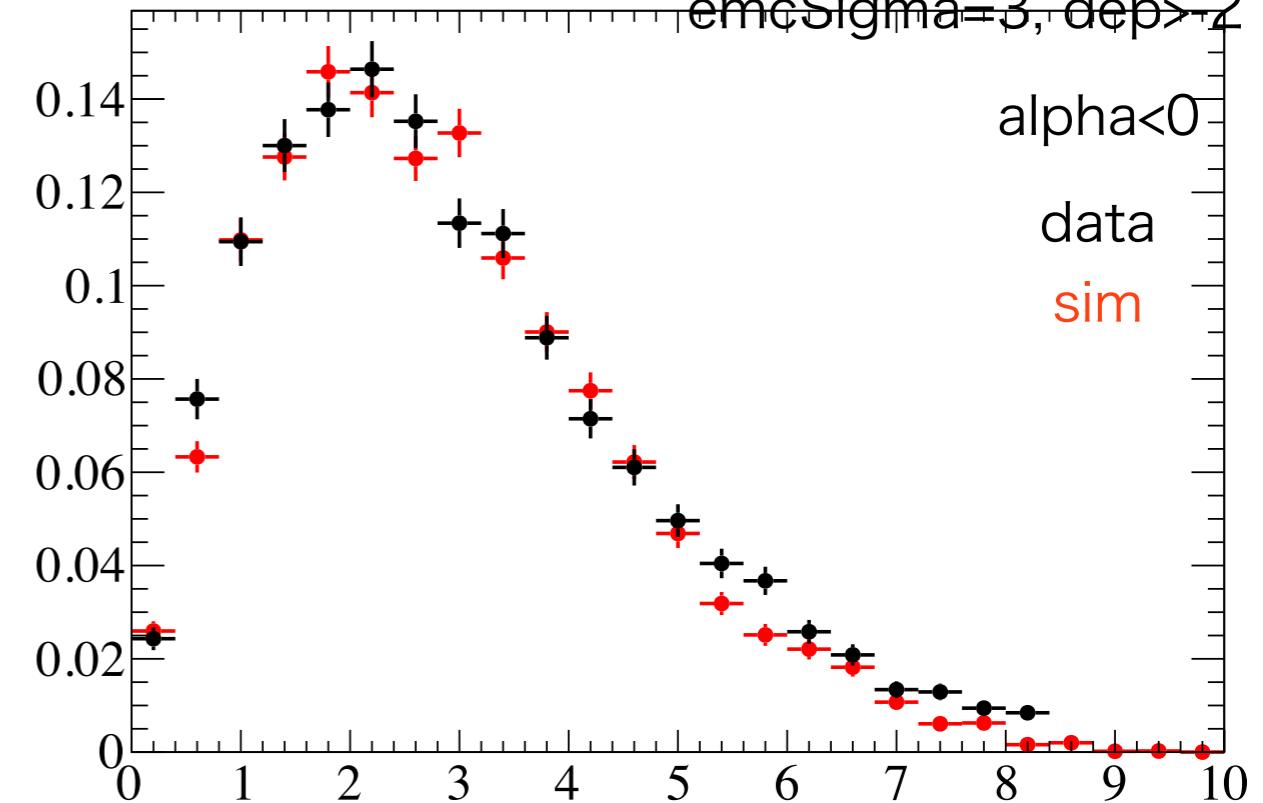
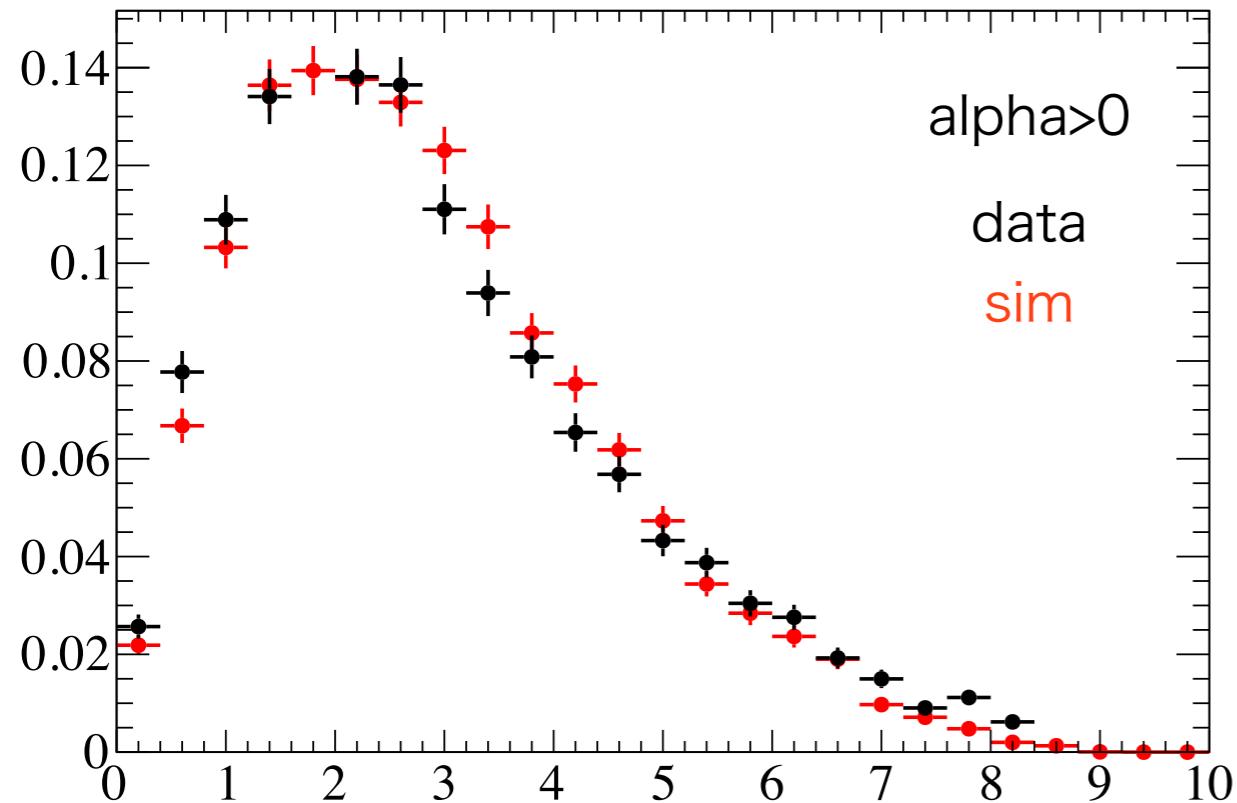


$n_0 > 2$	data	sim
$\alpha > 0$	0.73	0.77
$\alpha < 0$	0.73	0.77

Simulation tuning

(RICH,disp)

cent: 50%-
pt>0.2GeV, qual=31||51||63
emcSigma=3, dep>2

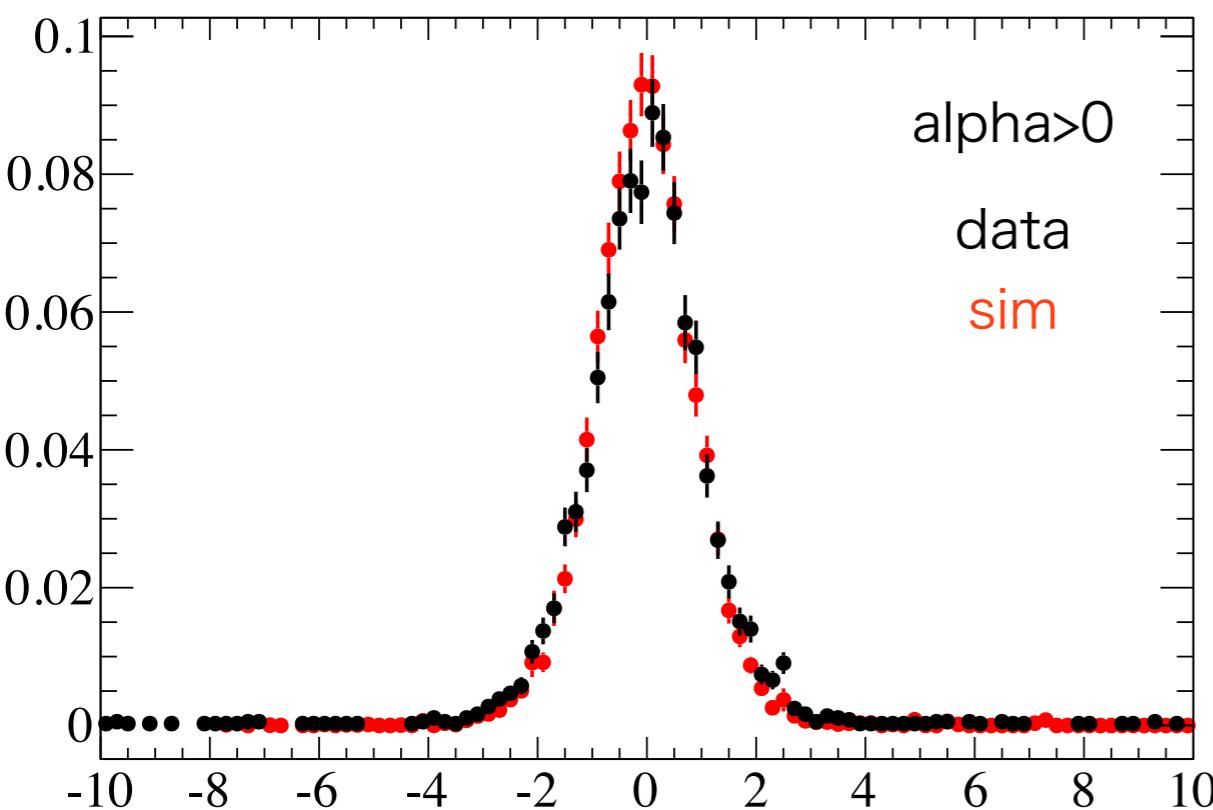


disp<5	data	sim
alpha>0	0.92	0.91
alpha<0	0.92	0.92

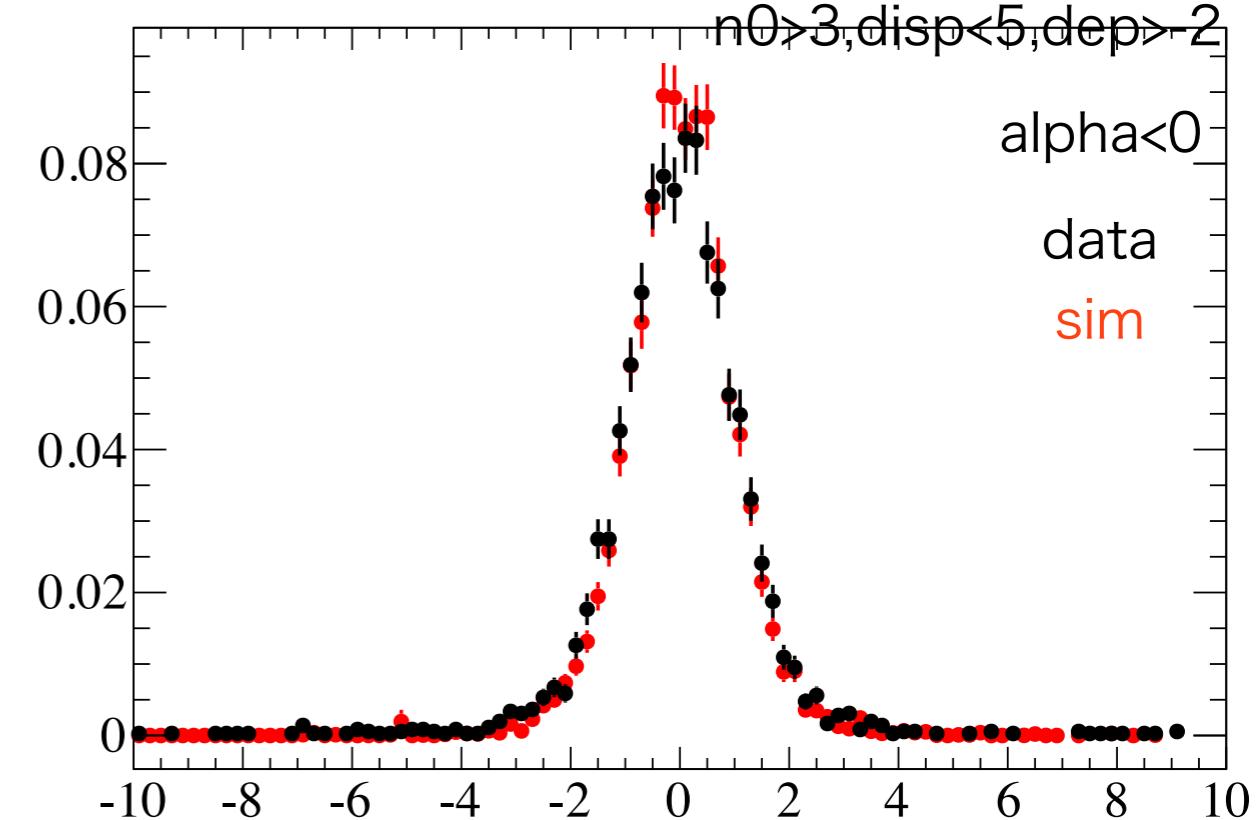
Simulation tuning

(emc,emcsdphi)

cent: 50%-
pt>0.2GeV, qual=31||51||63



alpha>0
data
sim



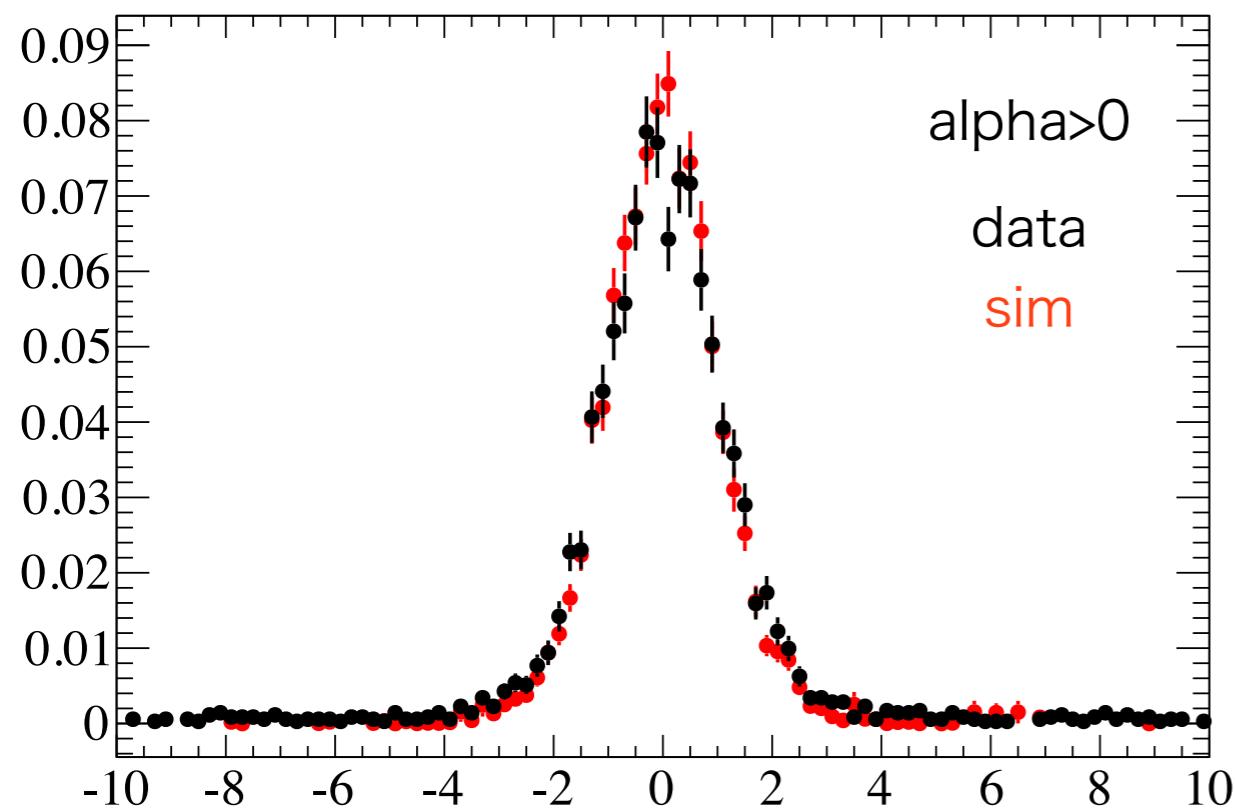
n0>3,disp<5,dep>2
alpha<0
data
sim

emcsdphi<3	data	sim
alpha>0	0.97	0.99
alpha<0	0.96	0.98

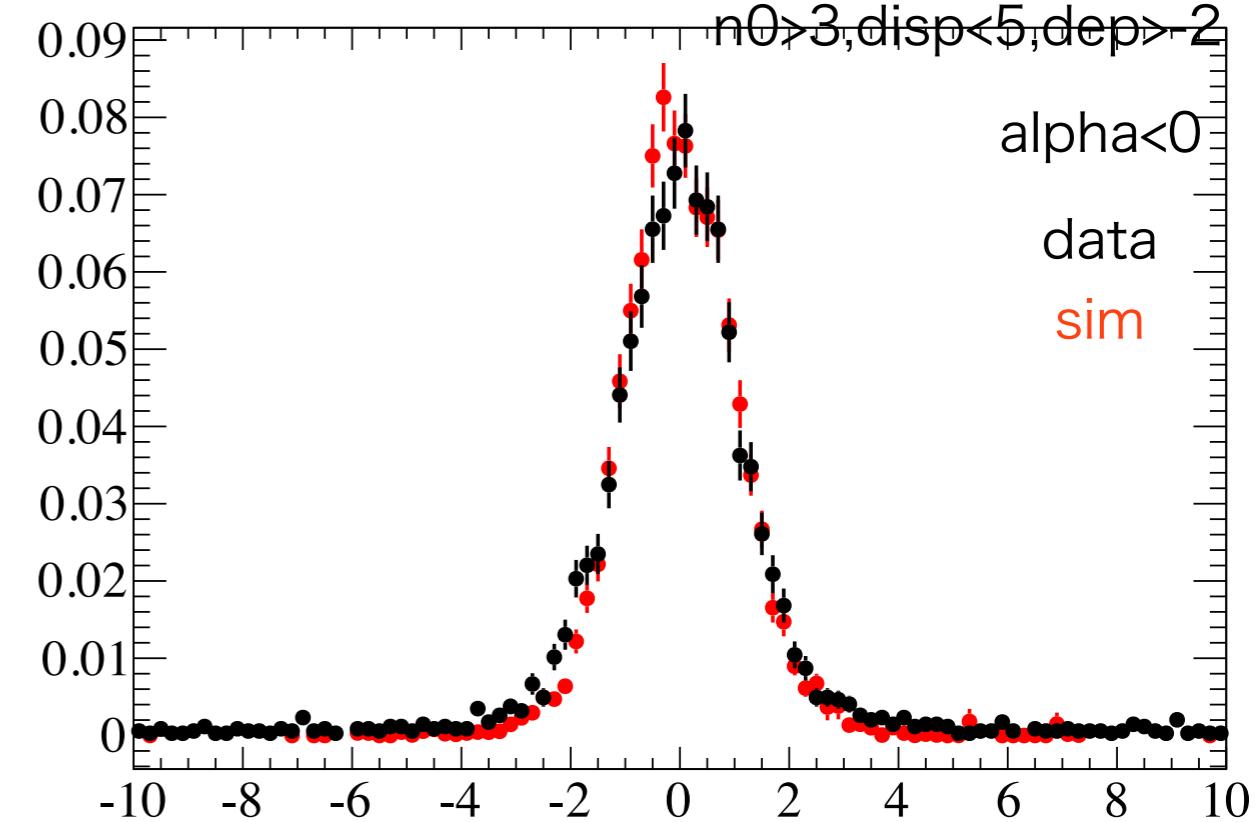
Simulation tuning

(emc,emcsdz)

cent: 50%-
pt>0.2GeV, qual=31||51||63



alpha>0
data
sim

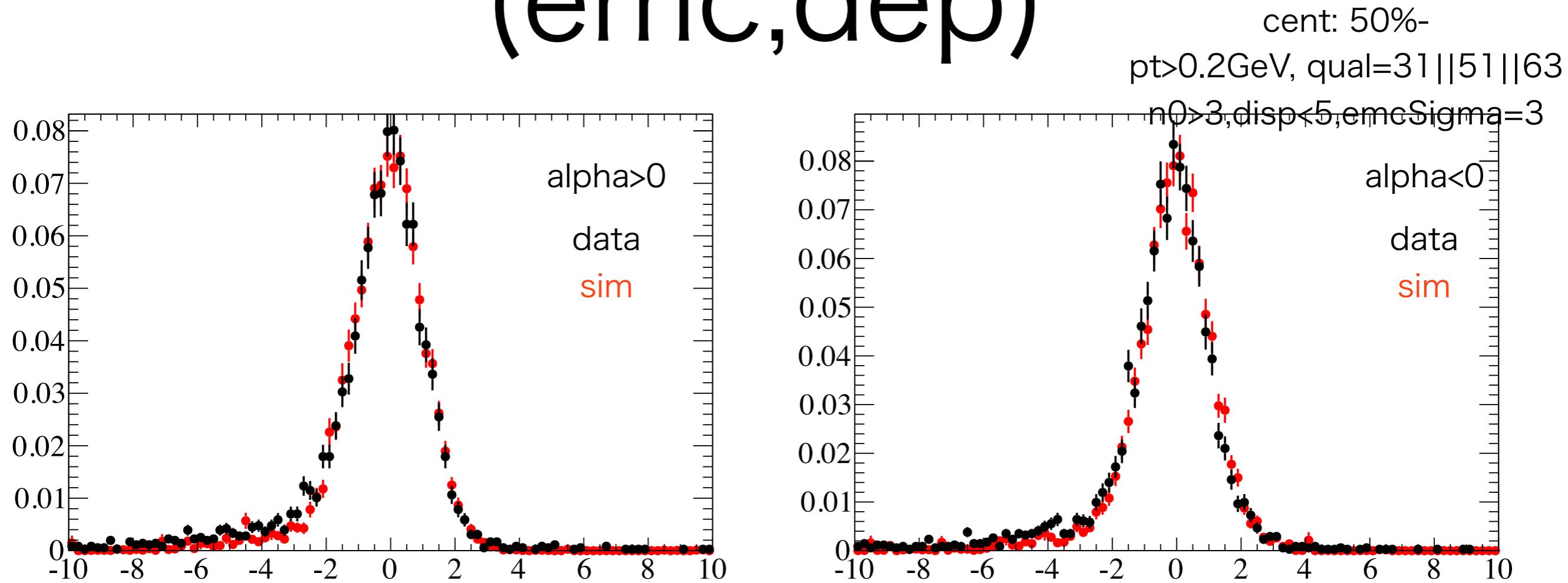


n0>3, disp<5, dep>2
alpha<0
data
sim

emcsdz<3	data	sim
alpha>0	0.94	0.98
alpha<0	0.93	0.99

Simulation tuning

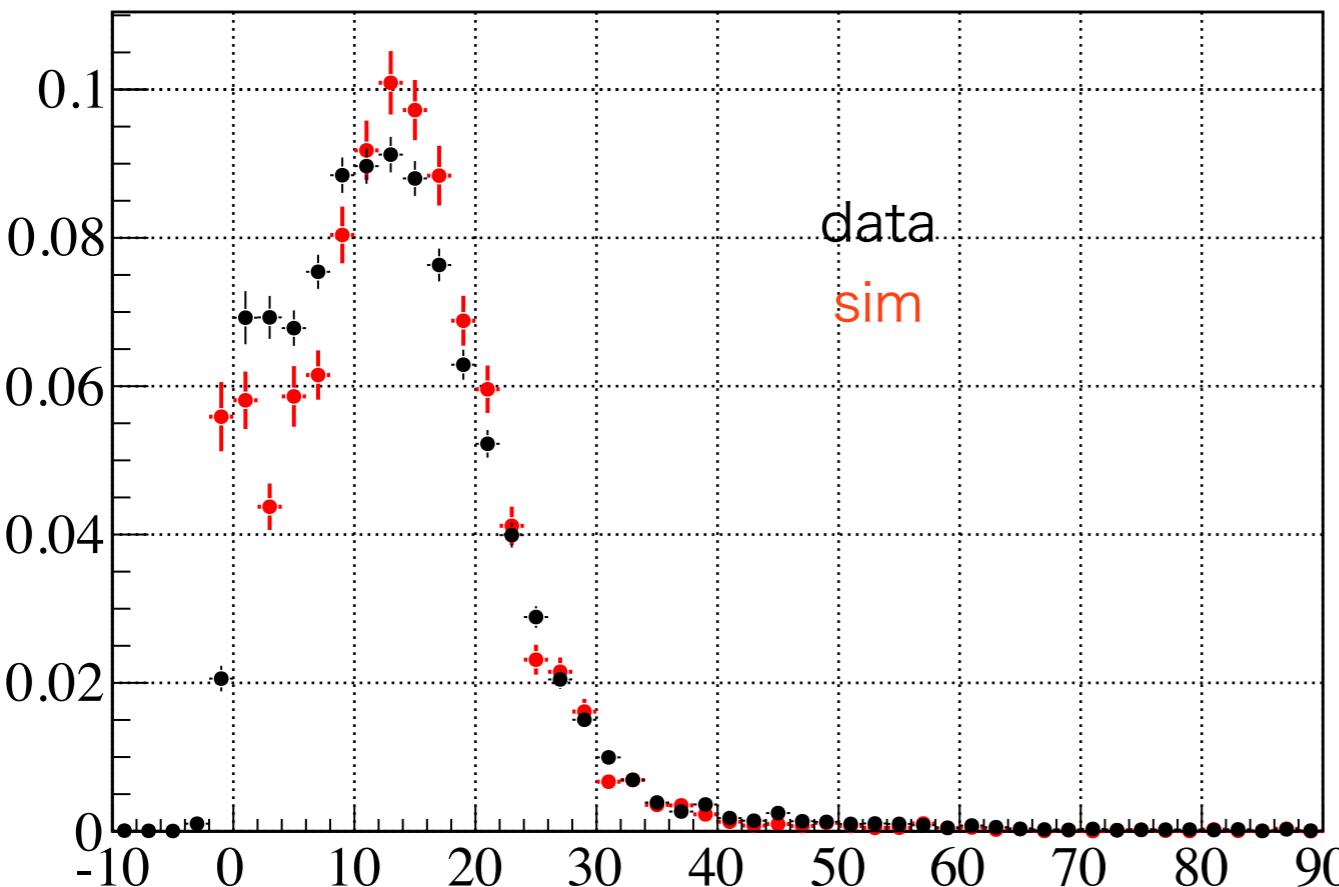
(emc,dep)



dep>-2	data	sim
alpha>0	0.86	0.90
alpha<0	0.87	0.92

Simulation tuning

(hbd,hbdcharge(minpad))



- Select single charge
- Centrality: 60-92%
- $25\text{MeV} < \text{mass} < 50\text{MeV}$
- opening angle $> 100\text{mrad}$
- phiV cut
- Simulation
- pt-weighted single electron

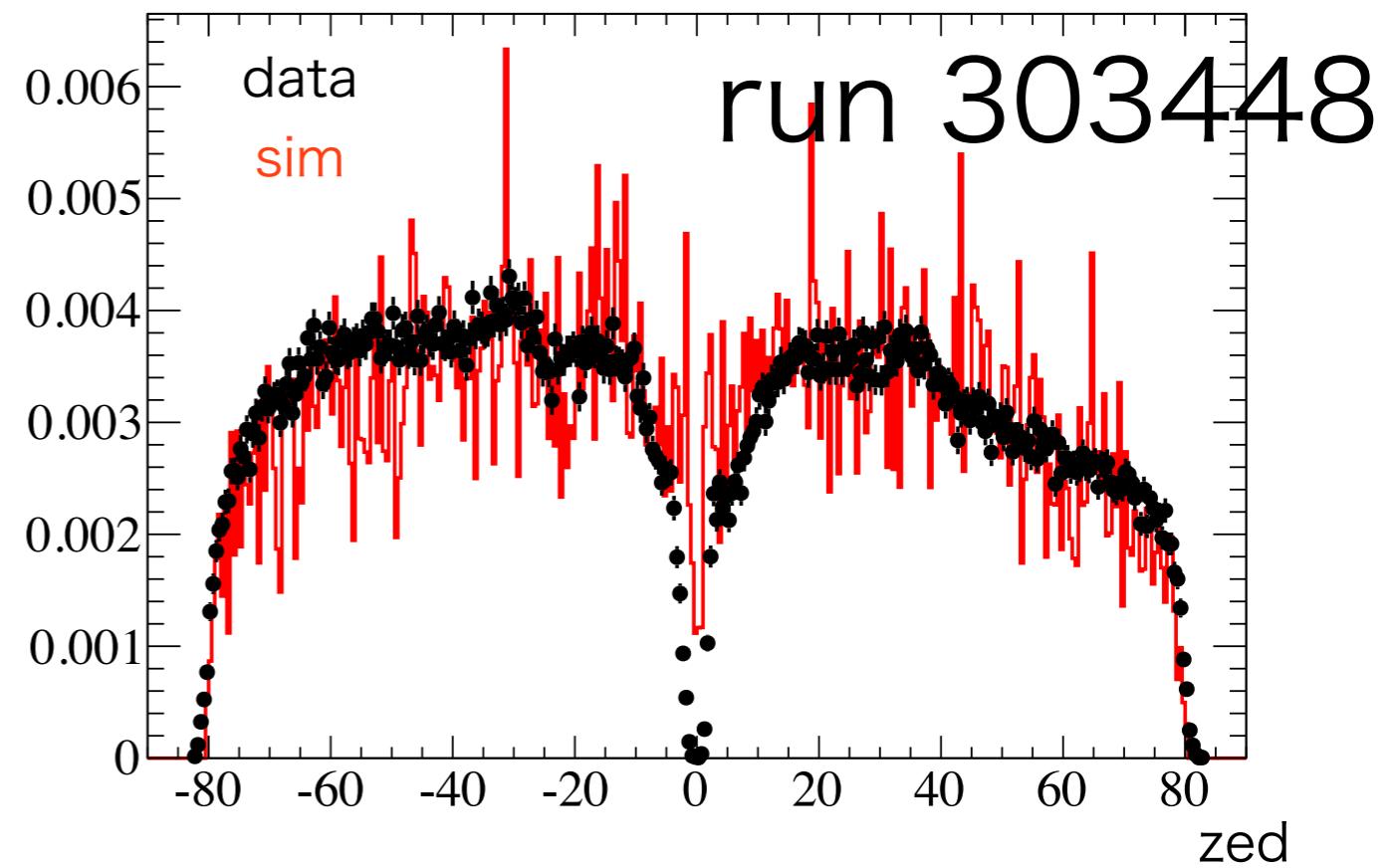
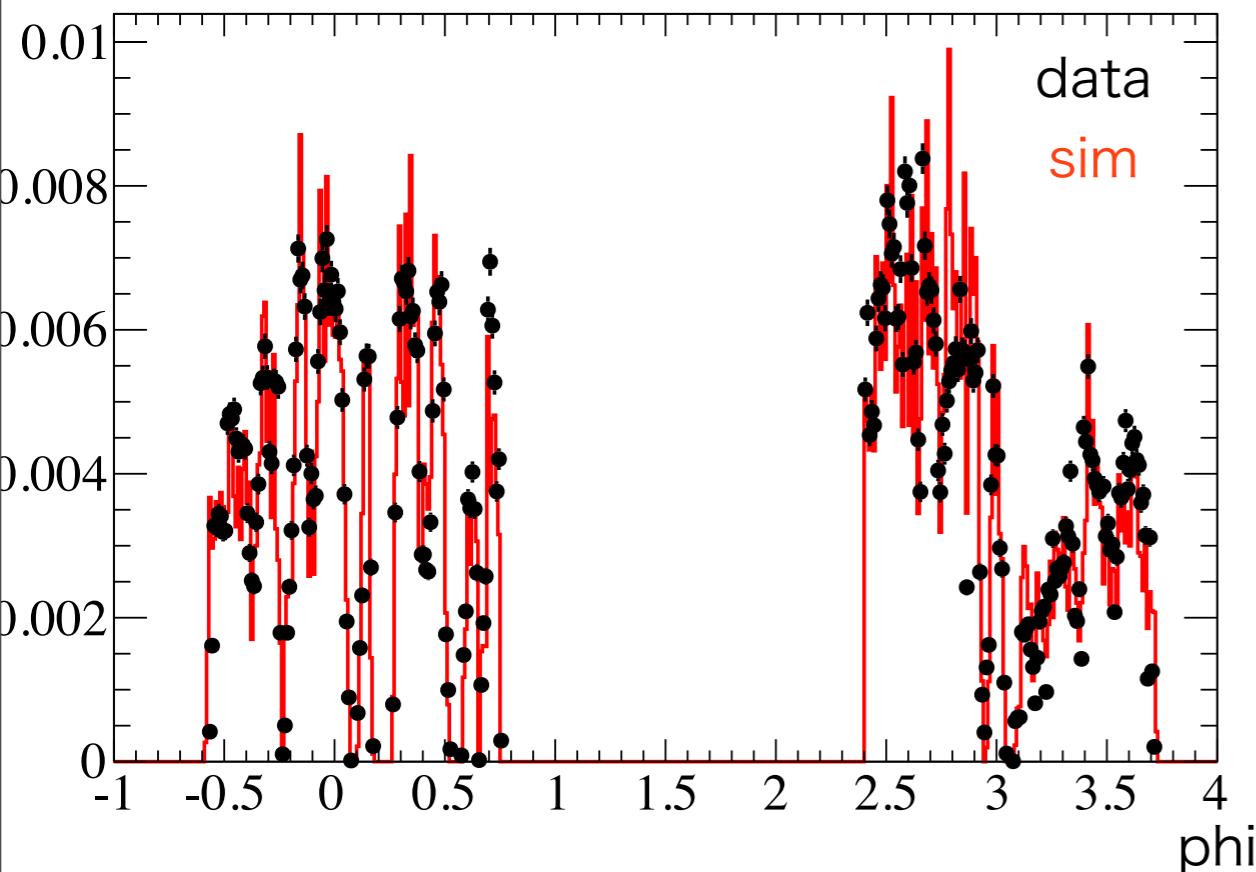
charge>2	data	sim
	0.84	0.84

DC-PC 1 fiducial cut

	Fiducial cut	Nevt
300475-304242	Type A	0.4B
	Type B	0.3B
	Others	0.6B
	Discarded	0.1B
304242-306685	Type B	0.5B
	Others	0.3B
	Discarded	0.2B
306691-310453	Type C	1.2B
	Type D	0.6B
	Others	0.6B
	Discarded	0.04B

Simulation tuning

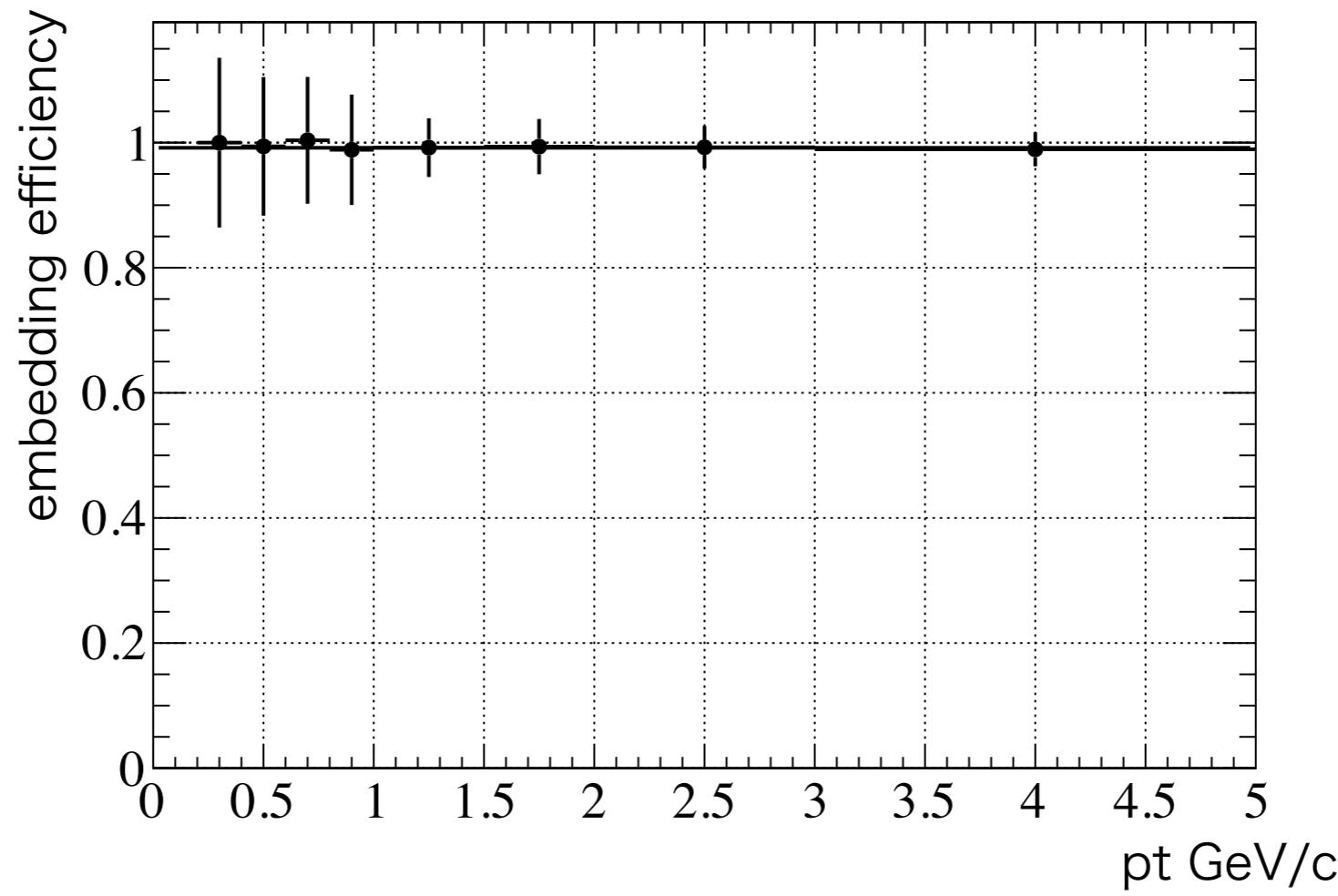
(dc,acceptance)



- eID efficiency + acceptance estimation
 - J/Psi is generated with flat pt distribution then applied mT-scaling
 - eid
 - $n0 > 2, \text{disp} < 5, \text{dep} > -2, \sqrt{(\text{emcsdphi}^2 + \text{emcsdz}^2)} < 3, \text{hbdid} \geq 20$
 - $\varepsilon = \text{Nreco}/\text{Ngen} = 0.004764$

embedding efficiency

(60-92%)



BdN/dy (Centrality: 60-92%)

$$B \frac{dN}{dy} = \frac{N_{J/\psi}}{N_{evt}} \frac{1}{\Delta y \epsilon_{eid+acc} \epsilon_{embed} \epsilon_{ghostcut}}$$

3.28*10⁻⁸ Not yet 0.00476 0.99 Not yet

